



# Shiprock, New Mexico, Disposal Site

## Long-Term Surveillance and Maintenance Program



U.S. Department of Energy  
Grand Junction Office

# FACT SHEET

*The Grand Junction Office has provided cost-effective and efficient stewardship for more than 10 years*

## Overview

Uranium ore was processed at the former Navajo Mill at Shiprock, New Mexico, between 1954 and 1968. The milling operations created process-related wastes and tailings, a sandlike material containing radioactive materials and other contaminants. The U.S. Department of Energy (DOE) completed cleanup of the Shiprock site in November 1986 by encapsulating the mill tailings in an engineered disposal cell.

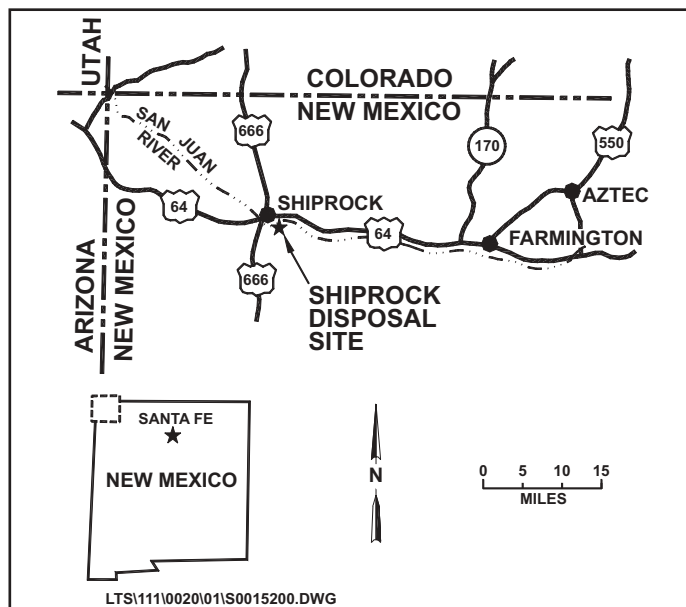
Upon cell closure and preparation of a long-term surveillance plan, the U.S. Nuclear Regulatory Commission granted DOE a general license for custody and long-term care of the surface impoundment at the Shiprock site in September 1996. Responsibility for the long-term care of the disposal site was assigned to the Long-Term Surveillance and Maintenance (LTSM) Program at the DOE Grand Junction Office. Because the site is on Navajo Nation land, the Navajo Nation retains title to the land.

In 1988, DOE established the LTSM Program to provide stewardship of disposal cells that contain low-level radioactive material after completion of environmental restoration activities. The mission of the LTSM Program is to ensure that the disposal cells continue to prevent the release of contaminated materials to the environment. These materials will remain potentially hazardous for thousands of years. As long as the disposal cells function as designed, risks to human health and the environment are negligible.

The LTSM Program maintains the safety and integrity of the disposal cell sites through periodic monitoring, inspections, and maintenance; serves as a point of contact for stakeholders; and maintains an information repository at the DOE Grand Junction Office for sites in the LTSM Program.

## Regulatory Setting

Congress passed the Uranium Mill Tailings Radiation Control Act in 1978 (Public Law 95-604) that specified remedial action at 24 inactive processing sites where uranium was produced for the Federal Government. DOE remediated these sites under the Uranium Mill Tailings Remedial Action Project and encapsulated the radioactive materials in U.S. Nuclear Regulatory Commission-approved disposal cells. Cleanup standards



were promulgated by the U.S. Environmental Protection Agency (EPA) in Title 40 *Code of Federal Regulations* (CFR) Part 192. The U.S. Nuclear Regulatory Commission license was issued in accordance with 10 CFR 40.

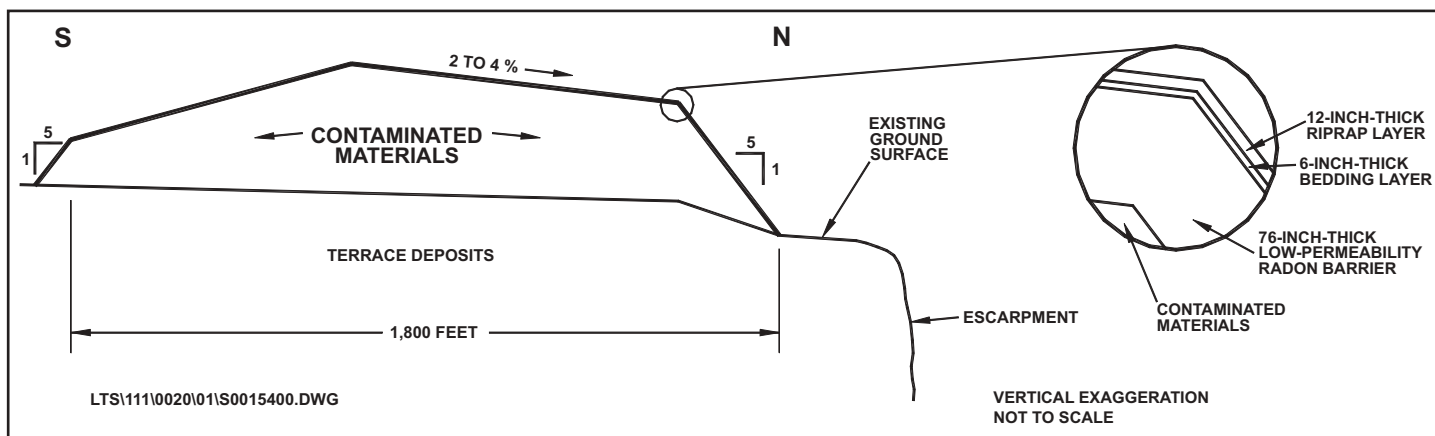
## Shiprock Disposal Site

The Shiprock Disposal Site is located approximately 1 mile south of the town of Shiprock in San Juan County, New Mexico. Surrounding land is used for residential and commercial purposes.

The disposal site is situated on an elevated river terrace on the southwest side of the San Juan River. A steep escarpment along the northern edge of the site separates the site from the floodplain of the river. The disposal cell lies on 10 to 45 feet of terrace alluvium.

The alluvium consists of sand and silt with lenses of gravel and cobbles.

The alluvium is underlain by Mancos Shale, of which the upper 10 feet is weathered and fractured. Groundwater in the alluvium and in the upper part of the Mancos Shale is unconfined; this zone constitutes the uppermost aquifer beneath the disposal site. Groundwater in this aquifer is not considered a potential source of drinking water because of poor quality and low yield. Because the aquifer has low yield and the groundwater quality is poor, groundwater monitoring to evaluate cell performance is not required at the Shiprock site.



*South-North Cross Section of Shiprock Disposal Cell*

Kerr-McGee built and operated the mill at Shiprock from 1954 until 1963. Vanadium Corporation of America purchased the mill and operated it until 1968. The mill, ore storage area, raffinate ponds (basins to contain spent liquids from the milling process), and tailings piles occupied approximately 230 acres leased from the Navajo Nation. Tailings resulting from operations at the Shiprock mill were deposited in two piles covering approximately 72 acres. When the lease for the site expired, control of the site reverted to the Navajo Nation.

After 1968, the Navajo Engineering and Construction Authority occupied 40 acres of the former millsite. The facility was used as a training school for heavy equipment operators, who used the lower tailings pile as a practice ground. As a result of EPA radiological surveys, training activities were redirected toward decontamination of the site and interim stabilization of the tailings.

In 1983, DOE and the Navajo Nation entered into an agreement for site cleanup. By September 1986, all tailings and associated materials (including contaminated materials from off-site vicinity properties) were encapsulated in the disposal cell built on top of the existing tailings pile. The disposal cell contains 2,520,000 wet tons (approximately 1.9 million cubic yards) of contaminated materials with a total activity of 746 curies of radium-226.

## Cell Design

The Shiprock Disposal Cell is an asymmetrical pentagon with a maximum side length of 1,800 feet and a minimum side length of 800 feet. The cell occupies approximately 77 acres of the 105-acre site. A posted wire fence surrounds the cell.

The cover of the Shiprock Disposal Cell is a multi-component system designed to encapsulate and isolate

the contaminated materials for 1,000 years. A low-permeability radon barrier, consisting of compacted sandy silty soils, was placed over the compacted tailings. This layer is designed to prevent precipitation from percolating through the contaminated materials and into the underlying soil and to reduce radon emissions. The erosion-protection layer for the top and side slopes of the cell consists of a layer of rock (riprap) underlain by a layer of granular bedding material. The use of these cover materials promotes rapid runoff of precipitation to minimize leachate. Rock-lined drainage ditches divert surface water runoff around and away from the disposal cell to a rock-lined energy dissipation area.

## LTSM Program Activities

The LTSM Program manages the site according to a long-term surveillance plan (LTSP) prepared specifically for the Shiprock site. Under provisions of the LTSP, the LTSM Program conducts annual inspections of this site to evaluate the condition of surface features and performs site maintenance as necessary.

The disposal cell at Shiprock is designed and constructed to last for 200 to 1,000 years. However, the general license has no expiration date, and DOE understands that its responsibility for the safety and integrity of the Shiprock site will last indefinitely.

## Contacts

For more information about the LTSM Program or about the Shiprock Disposal Site, contact

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<http://www.gjo.doe.gov/programs/ltsm>